CONTENTS

Volume 21, Issue Nos. 1–12 (1985)

International Journal for

NUMERICAL METHODS IN ENGINEERING

Issue No. 1

Accelerated 'Relaxation' or Direct Solution? Future Prospects for FEM: O. C. Zienkiewicz and R. Löhner 1

Solenoid Simulation with Mechanical Motion: J. A. MacBain 13

Thin Turbomachinery Blade Design Using a Finite-volume Method: J. V. Soulis . . 19

Sparse Matrix Factor Modification in Structural Reanalysis: K. H. Law 37

A Solution Method for Planar and Axisymmetric Contact Problems: K. J. Bathe and A. Chaudhary 65

Equivalence Between Mixed Models and Displacement Models Using Reduced Integration: H. Shimodaira 89

An Improved Three-noded Triangular Element for Plate Bending: A. J. Fricker . . 105

A Boundary Integral Equation Method for Radiation and Scattering of Elastic Waves in Three Dimensions: F. J. Rizzo, D. J. Shippy and M. Rezayat 115

A Six-node Finite Element for Plate Bending: S. W. Lee and J. C. Zhang 131

Interactive Buckling Analysis with Finite Strips: R. Benito and S. Sridharan 145

Analysis of Some Fully-discrete Algorithms for the One-dimensional Heat Equation: T. J. R. Hughes and T. E. Tezduyar 163

A General Matrix Operator for Linear Boundary Value Problems in Slip-line Field Theory: P. Dewhurst 169

A Simple Approach to Bifurcation and Limit Point Calculations: M. Fujikake . . . 183

BOOK REVIEW 193

ANNOUNCEMENT 193

CONFERENCE DIARY 194

Indexed or abstracted by 'Current Contents', 'Science Citation Index' and other leading Indexing/Abstracting Services

Issue No. 2

Potential Integrals Associated with Quadratic Distributions in a Triangular Domain: E. E. Okon 197

Accurate Numerical Integration of Singular Boundary Element Kernels over Boundaries with Curvature: M. H. Lean and A. Wexler 211

On the Accuracy of Finite Difference Solutions to Elliptic Partial Differential Equations: E. R. De Arantes E Oliveira. 229

An Explicit Conditionally Stable Finite Difference Equation for Heat Conduction Problems: M. C. Bhattacharya 239

Structural Design Sensitivity Analysis with General Boundary Conditions: Dynamic Problem: C. C. Hsieh and J. S. Arora 267

Analysis of Laminated Bimodulus Composite Thin Shells of Revolution Using a Doubly Curved Quadrilateral Finite Element: P. V. Ramana Murthy and K. P. Rao. 285

Explicit Expressions for Energy Release Rates Using Virtual Crack Extensions: R. B. Haber and H. M. Koh. 301

Geometrically Nonlinear Formulation of a 48 D. O. F. Quadrilateral Shell Element with Rational B-Spline Geometry: T. Y. Yang, C. J. Moore and D. C. Anderson 317

An Approach to Automatic Three-dimensional Finite Element Mesh Generation: J. C. Cavendish, D. A. Field and W. H. Frey. 329

Numerical Solution to a Two-dimensional Inverse Heat Conduction Problem: H. R. Busby and D. M. Trujillo 349

On the Diffusive and Dispersive Effect of Displaced Integration Points in Finite Element Analysis: I. Kinnmark and G. F. Pinder 361

SHORT COMMUNICATION

A Four-node Plate Bending Element on Mindlin/Reissner Plate Theory and a Mixed Interpolation: K. J. Bathe and E. N. Dvorkin. 367

BOOK REVIEWS 385

BOOKS RECEIVED 386

ANNOUNCEMENTS. 386

CONFERENCE DIARY 387

Issue No. 3

The Curved Beam/Deep Arch/Finite Ring Element Revisited: G. Prathap. 389

Finite Element Analysis of Nonlinear Oscillators: K. Krishnamurthy, T. D. Burton and L. D. Zeller. 409

A Finite Element for the Three-dimensional Deformation of a Circular Ring: A. O. Lebeck and J. S. Knowlton 421

Multiple Coplanar Embedded Elliptical Cracks in an Infinite Solid Subject to Arbitrary Crack Face Tractions: P. E. O'Donoghue, T. Nishioka and S. N. Atluri 437

Generalized Co-ordinate Partitioning in Static Equilibrium Analysis of Large-scale Mechanical Systems: P. E. Nikravesh and M. Srinivasan 451

Skyline Algorithms for Multilevel Substructure Analysis: A. E. Elwi and D. W. Murray 465

Theorems of Structural Variation: a Simplification: E. Atrek 481

The Mode-amplitude Technique and Hierarchical Stress Elements—a Simplified and Natural Approach: J. Robinson. 487

Generalized Finite Element Analysis with T-complete Boundary Solution Functions: A. P. Zielinski and O. C. Zienkiewicz. 509

Finite Prism Analysis of Plates and Shells: C. C. K. Wong and A. E. Vardy 529

Discretization of the Explicit Enthalpy Method for Planar Phase Change: K-H. Tacke 543

Analytical Representation of a Surface Defined Only at a Discrete Set of Points: E. Gharghoury 555

Nonlinear Static and Dynamic Analysis of Circular Plates and Shallow Spherical Shells Using the Collocation Method: Y. Nath, P. C. Dumir and R. S. Bhatia. 565

ANNOUNCEMENTS 579

CONFERENCE DIARY 583

Issue No. 4

An Isoparametric Joint/Interface Element for Finite Element Analysis: G. Beer . . . 585

Modelling and Estimation for a Moving Boundary Problem: M. O. Okuyiga and W. H. Ray 601

A Curved Quadrilateral Element for Static Analysis of Shells with Geometric and Material Nonlinearities. T. Y. Yang and S. Saigal 617

Variational Approach to First- and Second-order Sensitivity Analysis of Elastic Structures: K. Dems and Z. Mróz 637

The Boundary Integral Equation Method for the Solution of Problems Involving Elastic Slabs: D. L. Clements and M. Haselgrove 663

The Elastic–Plastic Analysis of Frames by the Theorems of Structural Variation: K. I. Majid and T. Celik 671

Numerical Analysis of Damped Transient Beam Vibrations by Use of Fourier Transforms: L. Karlsson 683

Combined Convection in an Annulus Applied to a Thermal Storage Problem: S. R. Zenen, M. W. Collins and J. R. Simonson 691

On the Galerkin Finite Difference Method: A Multi-bases Approach: D. Prochnow . . 713

Accuracy of Consistent and Lumped Viscous Dampers in Wave Propagation Problems: Y. K. Chow 723

INACOF—A Computer Program for the Inelastic Analysis of Reinforced Concrete Framed Structures: C. S. Gurujee and S. N. Agashe 733

The Gradient of the Finite Element Variational Indicator with Respect to Nodal Point Co-ordinates: An Explicit Calculation and Applications in Fracture Mechanics and Mesh Optimization: T. Sussman and K. -J. Bathe 763

ANNOUNCEMENTS 775

CONFERENCE DIARY 777

Issue No. 5

An Improved Boundary Integral Equation Method for Helmholtz Problems: J. O. Adeyeye, M. J. M. Bernal and K. E. Pitman 779

Modelling and State Estimation for a Two-dimensional Moving Boundary Problem: M. O. Okuyiga and W. H. Ray 789

Mixed Finite Element Procedure for Soil–Structure Interaction and Construction Sequences: C. S. Desai and J. G. Lightner 801

The Poor Bending Response of the Four-node Plane Stress Quadrilateral: G. Prathap . 825

Discrete Orthogonalization of Parameter Lines on Curved Surfaces for Finite Element Analysis of Thin Shells: J. Eberhardsteiner and H. A. Mang 837

A Comparison of Galerkin and Streamline Techniques for Integrating Strains from an Eulerian Flow Field: A. Agrawal and P. R. Dawson 853

The Dual Variable Method for Finite Element Discretizations of Navier/Stokes Equations: C. A. Hall, J. S. Peterson, T. A. Porsching and F. R. Sledge 883

Free Convection Heat Transfer to Steady Radiating Non-Newtonian MHD Flow Past a Vertical Porous Plate: A. R. Bestman 899

Finite Element Solution for Electromagnetic Scattering from Two-dimensional Bodies: J. L. Mason and W. J. Anderson 909

On Body-fitted Co-ordinates for Separated Laminar Flows Past Wall-mounted Obstacles: P. K. Yeung and S. C. Kot 929

Inelastic Finite Strain Analysis of Structures Subjected to Nonproportional Loading: N. T. Tseng and G. C. Lee 941

Singularity of Collapsed Q-8 Finite Element: V. Banthia 959

LETTER TO THE EDITOR 967

ANNOUNCEMENTS 971

CONFERENCE DIARY 973

Issue No. 6

Stability and Convergence of Some Finite Element Algorithms for Nonlinear Elastodynamics: S. M. Hamdan and N. Patamapongs 975

An Additional Stiffness Parameter Measure of Error of the Second Kind in the Finite Element Method: G. Prathap 1001

The Complex Variable Boundary Element Method: Applications: T. V. Hromadka II, C. C. Yen and G. L. Guymon 1013

A Procedure to Debug Computer Programs: T. M. Shih 1027

Finite Element Hourglassing Control: J. C. Schulz. 1039

A CAD Approach to the Minimum Weight Design Problem: B. J. D. Esping 1049

Velocity Pressure Distribution in Grain Bins—Brooker's Model: M. J. Miketinac and S. Sokhansanj. 1067

Generalized Finite Difference Representations of the Laplacian Operator in *n*-dimensional Euclidean Space: E. E. Okon 1077

Non-stationary Statistical Solutions of a Class of Random Diffusion Equations: Analytical and Numerical Considerations: S. Tasaka 1097

Nonlinear Dynamic Analysis with a 48 D.O.F. Curved Thin Shell Element: S. Saigal and T. Y. Yang 1115

High Degree Efficient Symmetrical Gaussian Quadrature Rules for the Triangle: D. A. Dunavant 1129

A Simple Plate/Shell Triangle: G. Prathap 1149

Evaluation of Added Mass by a Cloning Algorithm: G. Dasgupta 1157

ADDENDUM. 1165

BOOK REVIEWS 1166

ANNOUNCEMENTS 1167

CONFERENCE DIARY 1168

Issue No. 7

Numerical Differentiation of Tabulated Functions with Automatic Choice of Step-size: J. M. McNamee 1171

A Continuous Plasticity Version of the Critical State Model: D. J. Naylor 1187

Beam Element Matrices Derived from Vlasov's Theory of Open Thin-walled Elastic Beams: P. O. Friberg 1205

Mapped Infinite Elements for Exterior Wave Problems: O. C. Zienkiewicz, K. Bando, P. Bettess, C. Emson and T. C. Chiam 1229

Approximate Force Method Reanalysis Techniques in Structural Optimization: H. Ding and R. H. Gallagher 1253

Evaluation of 'Special' Finite Elements with Non-conventional Gaussian Quadratures: R. J. Bernhard and D. K. Holger 1269

Processing Nonlinear Multipoint Constraints in the Finite Element Method: O. S. Narayanaswamy 1283

An Alternative Explicit Formulation for the DKT Plate-bending Element: C. Jeyachandrabose, J. Kirkhope and C. Ramesh Babu. 1289

Comparison of Boundary and Finite Element Methods for Moving-boundary Problems Governed by a Potential: E. C. Hume III, R. A. Brown and W. M. Deen 1295

A Numerical Study of Various Algorithms Related to the Preconditioned Conjugate *Gradient Method: C. P. Jackson and P. C. Robinson* 1315

Solution of Cyclic Plasticity Problems by an Elasto-viscoplastic Model: M. Aufaure . 1339

A Unified Set of Single Step Algorithms, Part 3: The Beta-*m* Method, a Generalization of *the Newmark Scheme: M. G. Katona and O. C. Zienkiewicz* 1345

ANNOUNCEMENTS 1361

CONFERENCE DIARY 1363

Issue No. 8

Vibrations of Twisted Cantilever Plates—a Comparison of Theoretical Results: R. E. Kielb, A. W. Leissa and J. C. MacBain. 1365

The Simulation of the Glycerin/Air Test for Predicting Thermal Products of Insulated Metal Substrates: P. C. Meek and J. Norbury 1381

A Superconvergence Result for the Natural Extrapolation Formula for the Numerical Determination of Stress Intensity Factors: N. I. Ioakimidis 1391

A New Mesh Generation Scheme for Arbitrary Planar Domains: S.H. Lo. 1403

A Finite Element Solution of a Tidal Current Problem in the Seto Inland Sea by Using the ICCG Method: M. Watanabe, H. Nakajima and M. Mori 1427

Application of Integral Equations to Solving Inverse Problems of Stationary Electromagnetic Fields: K. Adamiak. 1447

Necessary Convergence Conditions for Upwind Schemes in the Two-dimensional Case: H.-G. Roos 1459

Special Finite Elements with Holes and Internal Cracks: R. Piltner 1471

Calculation of Approximate Weight Functions in Fracture Mechanics by FEM: P. Morawietz, C. Mattheck and D. Munz 1487

A Finite Element–Equivalent Energy Linearization Technique for the Analysis of Nonlinear Plate Vibration: M. A. E. Ghabrial, R. K. Miller and L. C. Wellford, Jr. . . 1499

Finite Element Method for In-plane Vibrations of Rotating Timoshenko Rings and Sectors: K. Singh and B. P. Singh 1521

Sensitivity Calculations for Iteratively Solved Problems: R. T. Haftka 1535

Complete Quadratic Isoparametric Finite Elements in Fracture Mechanics Analysis: C. Manu 1547

BOOK REVIEWS 1555

ANNOUNCEMENT 1557

CONFERENCE DIARY 1558

Issue No. 9

Accuracy and Stability of Integration Algorithms for Elastoplastic Constitutive Relations: M. Ortiz and E. P. Popov 1561

A Method for Solving Algebraic Systems Consisting of Linear and Nonlinear Equations: R. P. Tewarson and D. Q. Chen 1577

A Study of Mathematical Programming Methods for Structural Optimization. Part I: Theory: A. D. Belegundu and J. S. Arora 1583

A Study of Mathematical Programming Methods for Structural Optimization. Part II: Numerical Results: A. D. Belegundu and J. S. Arora 1601

An Algorithm Based on the Boundary Element Method for Problems in Engineering Mechanics: M. Vable 1625

A Finite Element Method for Analysing Skin Effect in Conductors with Unknown Values of Surface Boundary Conditions: A. K. Gąsiorski 1641

Finite Element Analysis of Unbounded and Incompressible Fluid Domains: S. K. Sharan 1659

Transmission Line Interpretation of the Finite Element Mesh for a Wave Propagation Problem: J. L. Mason and W. J. Anderson 1671

Projection and Iteration in Adaptive Finite Element Refinement: G. F. Carey and M. Seager 1681

Finite Element Formulations for Non-steady-state Large Viscoplastic Deformation: C. Bohatier and J.-L. Chenot 1697

Finite Layer Analysis of Layered Viscoelastic Materials under Three-dimensional Loading Conditions: J. R. Booker and J. C. Small 1709

Eigenvalues and Stable Time Steps for the Bilinear Mindlin Plate Element: T. Belytschko and J. I. Lin 1729

CONFERENCE DIARY 1747

ANNOUNCEMENT 1748

Issue No. 10

An Application of Global Approximations in the Finite Element Method: E. J. Allen . 1749

Through-the-thickness Stress Predictions for Laminated Plates of Advanced Composite Materials: J. J. Engblom and O. O. Ochoa. 1759

Economical Symmetrical Quadrature Rules for Complete Polynomials over a Square Domain: D. A. Dunavant. 1777

Near-minimal Matrix Profiles and Wavefronts for Testing Nodal Resequencing Algorithms: B. A. Armstrong 1785

Analysis of Inequality and Residual Flow Procedures and an Iterative Scheme for Free Surface Seepage: D. R. Westbrook 1791

Petrov–Galerkin Finite Element Methods with a Hinged Test Space for Singularly Perturbed Problems: C. Fitzsimons, J. J. H. Miller and E. O'Riordan 1803

A Triangular Finite Element for Thin Plates and Shells: S. W. Lee, C. C. Dai and C. H. Yeom 1813

Boundary Type Finite Element Method for Surface Wave Motion Based on Trigonometric Function Interpolation: M. Kawahara and K. Kashiyama 1833

Curved Beam Elements to Model Noncircular Coil Shapes for Tokamak Reactor: V. N. Shah and N. H. Marshall. 1853

Vibration Analysis of Rotating Turbomachinery Blades by an Improved Finite Difference Method: K. B. Subrahmanyam and K. R. V. Kaza 1871

Finite Control Volume Method as Applied to a Slider Bearing with Side-leakage: M. R. Ullah and C. F. Kettleborough. 1887

Elastic–Viscoplastic, Large Deformation Formulations of a Curved Quadrilateral Thin Shell Element: S. Saigal and T. Y. Yang. 1897

On the Effect of Quarter-point Element Size on Fracture Criteria: N. A. B. Yehia and M. S. Shephard 1911

Material Modelling for Accurate Stresses in Involute Composites: E. L. Stanton . . . 1925

LETTER TO THE EDITOR. 1935

CONFERENCE DIARY 1938

ANNOUNCEMENT 1939

Issue No. 11

Comparison of Some Single-step Methods for the Numerical Solution of the Structural Dynamic Equation: S. N. Penry and W. L. Wood 1941

Improved Difference Approximations to the Heat Equation: W. Lick 1957

On an Alleged Philosophers' Stone Concerning Variational Principles with Subsidiary Conditions: H. A. Mang, G. Hofstetter and R. H. Gallagher 1971

Analysis of Heat Conduction in Solids by Space-Time Finite Element Method: J. R. Yu and T. R. Hsu 2001

A Consistent Finite Element Technique for Recovery of Distributed Reactions and Surface Tractions: R. B. Haber 2013

Fixed-point Iteration to Nonlinear Finite Element Analysis. Part I: Mathematical Theory and Background: I. Zeid 2027

Fixed-point Iteration to Nonlinear Finite Element Analysis. Part II: Formulation and Implementation: I. Zeid 2049

A New Method for Evaluating Singular Integrals in Stress Analysis of Solids by the Direct Boundary Element Method: H-B. Li, G-M. Han and H. A. Mang 2071

Continuously Deforming Finite Elements: A. C. Mueller and G. F. Carey 2099

BOOK REVIEWS 2127

CONFERENCE DIARY 2128

ANNOUNCEMENTS 2129

Issue No. 12

Discrete Numerical Solution of the Generalized Boussinesq Problem: M. Gellert . . 2131

A Generalized Displacement Method for the Finite Element Analysis of Thin Shells: L. X. Kui, G. Q. Liu and O. C. Zienkiewicz 2145

On the Implementation of Iterated Defect Correction to Finite Difference Methods for Elliptic Boundary-value Problems: J. Hertling 2157

An Approach for Undrained Geotechnical Problems Accounting for the Development of Partial Saturation: F. Genna and G. Gioda 2169

Unilateral Buckling of Thin Elastic Plates by the Boundary Integral Equation Method: G. Bezine, A. Cimetiere and J. P. Gelbert 2189

Analysis of Laminated Composite Plates Using a Higher-order Shear Deformation Theory: N. D. Phan and J. N. Reddy 2201

Taylor Expansions for Singular Kernels in the Boundary Element Method: M. H. Aliabadi, W. S. Hall and T. G. Phemister 2221

Nonlinear Subincremental Method for Determination of Elastic-Plastic-Creep Behaviour: N. S. Ottosen and O. Gunneskov 2237

On the Heat-flow Distribution from and the Temperature Profile on an Equally Heated Rectangle, Calculated by Series Development: J. K. Nieuwenhuizen 2257

Automated Computer Simulation of Two-dimensional Elastostatic Problems by the Finite Element Method: M. Yokoyama 2273

Exact Bernoulli-Euler Dynamic Stiffness Matrix for a Range of Tapered Beams: J. R. Banerjee and F. W. Williams 2289

BOOK REVIEWS 2303

CONFERENCE DIARY 2305

ANNOUNCEMENT 2306

Author Index 2308